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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/500,150	07/12/2004	Takeshi Kumagai	255449US0PCT	3106
22850	7590	01/31/2006	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			LE, THAO P	
			ART UNIT	PAPER NUMBER
			2818	

DATE MAILED: 01/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/500,150	Applicant(s) KUMAGAI ET AL. 	
	Examiner Thao P. Le	Art Unit 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2 pages.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Priority

Acknowledge is made of applicants' claim for foreign priority base on an application 2002005827 filed in Japan on 01/15/02.

It is noted that Applicants have filled a certified copy of said application as required by U.S.C 119, which papers have been placed of record in the file.

Election/Restriction

Applicant's election with traverse of claims 1-10 is acknowledged.

The traversal is on the ground(s) that a search of all the claims would not impose a serous burden on the office. This is not found persuasive because the fields of search for method and apparatus claims are NOT coextensive and the determinations of patentability of method and apparatus claims are different, that is process limitations and apparatus limitations are given weight differently in determining the patentablity of the claimed inventions. Note that group I directs to a CVD apparatus and group II directs to a method of forming insulating film. These two groups are not related. The method of forming the insulating film comprising the step of depositing the insulating film on a substrate while the apparatus used to form insulating film comprising elements such as a processing chamber, a heater, an exhaust section, etc... and the apparatus can be used for other methods different from the method of group II invention. The

strategies for doing text searching of the apparatus claims and method claims are different. Thus, separate searches are required.

The requirement is still deemed proper and is therefore made FINAL.

Information Disclosure Statement

This office acknowledges of the following items from the Applicant:

Information Disclosure Statements (IDS) filed on 07/12/04, 08/11/04 and made of record. The references cited on the PTOL 1449 form have been considered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the

United States and was published under Article 21(2) of such treaty in the English language.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 1, 2 are rejected under 35 USC 102 (e) as being anticipated by Todd, U.S. Patent No. 6,733,830, hereinafter Todd.

Regarding claim 1, Todd discloses a CVD method of forming a silicon-containing insulating film comprising (See Cols. 1-28):

Supplying a film-formation gas into a process chamber comprising a substrate, while exhausting an interior of the process chamber, depositing the insulating film on the substrate wherein a carbon hydride is supplied together with the film-formation gas (abstract and Cols. 11-12; primary chemical precursors and secondary chemical precursors, lines 24-36, Col. 12).

Regarding claim 2, Todd discloses the carbon hydride gas is at least one of the gas selected from the group consisting of methane, ethane, propane (lines 28-30, Col. 12).

Claims 1, 2, 7, 8 are rejected under 35 USC 102 (e) as being anticipated by Huang et al., U.S. Patent No. 6,593,247, hereinafter Huang.

Regarding claims 1-2, Huang discloses a CVD method of forming a silicon-containing insulating film comprising (See Cols. 1-20):

Supplying a film-formation gas into a process chamber comprising a substrate, while exhausting an interior of the process chamber, depositing the insulating film on the substrate wherein a carbon hydride is supplied together with the film-formation gas (abstract and Cols. 1-20; one or more organosilicon such as bis(methyl-silano)methane, 1,2-bis(methylsilano)ethane and silane).

Regarding claims 7-8, Huang discloses the insulating film is silicon oxide and the gases are silane and oxidizing gas (Col. 5).

Claims 1, 2, 7, 8 are rejected under 35 USC 102 (e) as being anticipated by Chooi et al., U.S. Patent No. 6,436,824, hereinafter Chooi.

Regarding claim 1, Chooi discloses a CVD method of forming a silicon-containing insulating film comprising (See Cols. 1-22):

Supplying a film-formation gas into a process chamber comprising a substrate, while exhausting an interior of the process chamber, depositing the insulating film on the substrate wherein a carbon hydride is supplied together with the film-formation gas (abstract, the nitrogen-containing gas and mixture of organosilane gases in chemical deposition chamber, the organosilane gases contains carbon hydride).

Regarding claim 2, Chooi discloses the carbon hydride gas is at least one of the gas selected from the group consisting of methane, ethane, propane (the organo silicon compounds in Cols. 5-6).

Regarding claim 7, Chooi discloses the insulating film is silicon nitride film.

Regarding claim 8, Chooi discloses the wherein the film-formation gas comprises a first gas consisting of silane family gas and a second gas selected from the group consisting of nitride gas.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Todd, U.S. Patent No. 6,733,830, hereinafter Todd.

Regarding claim 10, Todd discloses a CVD method of forming an insulating film consisting of a film selected from the group consisting of silicon oxide film, silicon nitride, or silicon oxynitride film, the method comprising: supplying first, second, and third gases into the chamber whereas the first gas is silane gas, second gas is oxidizing gas, and third gas is carbon hydride gas (Cols. 11-12, silicon source, oxygen source or oxidizing agents, and carbon source). Todd fails to disclose the flow rate of the first and third gases. However, the selection of these parameters such as energy, concentration, temperature, time, molar fraction, depth, thickness, flow rate ratio, etc., would have been obvious and involve routine optimization which has been held to be within the level of ordinary skill in the art. "Normally, it is to be expected that a change in energy, concentration, temperature, time, molar fraction, depth, thickness, flow rate ratio, etc., or in combination of the parameters would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller* 105 USPQ233, 255 (CCPA 1955). See also *In re Waite* 77

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USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmischer 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).

Claims 3-6, 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Todd, U.S. Patent No. 6,733,830, hereinafter Todd.

Regarding claims 3-6, 9, Todd fails to disclose the processing chamber is with or without pre-heating when supply the carbon hydride gas and the flow rate of the gas. However, it is well known in the art that the insulating film can be formed with or without pre-heating the processing chamber when supplying the carbon hydride gas. It is obvious to one having ordinary skill in the art that the selection of the parameters such as energy, concentration, temperature, time, molar fraction, depth, thickness, flow rate ratio, etc., would have been obvious and involve routine optimization which has been held to be within the level of ordinary skill in the art. "Normally, it is to be expected that a change in energy, concentration, temperature, time, molar fraction, depth, thickness, flow rate ratio, etc., or in combination of the parameters would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim

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are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller* 105 USPQ233, 255 (CCPA 1955). See also *In re Waite* 77 USPQ 586 (CCPA 1948); *In re Scherl* 70 USPQ 204 (CCPA 1946); *In re Irmischer* 66 USPQ 314 (CCPA 1945); *In re Norman* 66 USPQ 308 (CCPA 1945); *In re Swenson* 56 USPQ 372 (CCPA 1942); *In re Sola* 25 USPQ 433 (CCPA 1935); *In re Dreyfus* 24 USPQ 52 (CCPA 1934).

Still regarding to claim 9, Todd discloses the first gas consisting of silane family gas but fails to disclose the silane family gas is selected from the group consisting of hexachlorodisilane, hexaethylaminodisilane etc... It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the silane gas above because these chemical precursors have similar functions as those disclosed in Todd which include silicon source.

Other references cited in PTO-892 also disclose the limitations recited in claim 1.

When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao P. Le whose telephone number is 571-272-1785. The examiner can normally be reached on M-T (7-6).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Thao P. Le', with a stylized, cursive script.

Thao P. Le

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